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Nest of *Vespula pennsylvanica* (Saussure).

ENTOMOLOGICAL NEWS

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A Colony of Yellow Jackets, Vespula pennsylvanica (Sauss.)

By FRANK K. SMITH, Pueblo, Colorado

About the first of October, 1955, Mr. G. A. Pauli of Pueblo, Colorado called my attention to a nest of yellow jackets in his yard. Dr. R. R. Dreisbach determined the species as *Vespula pennsylvanica* (Sauss.). The nest was underground in tight soil and its surface entrance was surrounded by a mound of dried mud, made of earth from the excavation below, mixed with the mouth secretion of the wasps. Though the mound had been completed when first seen, wasps were occasionally observed bringing small balls of mud to the surface and spreading them upon the mound. Usually, however, they flew away with them. The width of this mound in front at the base was three inches; the length, four; and the height, two and a half.

The earth was cut away, January 1, 1956, so as to provide a sectional view through the passage leading to the nest about ten inches below the surface, made and to expose also one-half of the paper envelope surrounding the brood chamber. The entire inner wall of the passage was found plastered with mud. A hole through which some of the comb was visible was made accidentally in uncovering the nest. Two other holes may have been made in uncovering the nest in October though their margins were smooth, as if finished by the wasps. This envelope did not consist of separate sheets arranged in succession around the brood chamber as in the nest of *Vespula maculata* (L.), but consisted of numerous small pieces arranged rather irregularly,

overlapping each other in a somewhat staggered manner. The edge of each piece was cemented partly or entirely to the surface it overlapped, and air spaces were enclosed between the pieces. On the average about three pieces with the air spaces between them made up the thickness of the envelope.

A root, approximately three-fourths of an inch in diameter, extended through the side of the envelope and was cemented to it. On the opposite side of the nest this root again extended through the envelope and was cemented to it. Across the space occupied by the combs, this dead root had been gnawed away, probably by the wasps.

With the exception of this root, the envelope was anchored principally to the ceiling of the excavation by a dozen or more stout bands of paper which were much larger than numerous paper rods that attached the layers of comb to each other. Some of these bands were about a third of an inch long and an eighth of an inch thick and held the envelope approximately a fourth of an inch from the ceiling. The earth to which these supporting bands were fastened was plastered with a layer of mud. It seems that the mud and the paper pulp held in common a cementing substance from the mouth secretion of the wasps. About a square inch of the envelope was cemented directly to the mud of the ceiling. A piece of dead root, about a fourth of an inch in diameter and two inches long, was cemented for its entire length into the top surface of the envelope and possibly small branches of this root aided some in anchoring the nest.

Plate I shows the nest in its natural position with part of the envelope cut away. Seven layers of comb may be seen. On removing the nest from the ground an eighth layer, not previously seen, broke away from the seventh layer to which it was attached by a single rod of paper. All the other comb layers were attached to the part of nest above them by numerous rods. Some of these are seen between the first and second layers. These rods were from one sixteenth to one thirty-second of an inch in diameter. The combs themselves were somewhat oval in outline with their long axes parallel. There

is reason to believe that there was a bottom opening through the envelope into the brood chamber, but the envelope was too badly broken in removing the nest to permit a definite statement on this point.

The wall of the excavation was about a third of an inch from the envelope. In the bottom of the excavation there was an opening approximately three-fourths of an inch in diameter leading into a burrow which was traced for nearly two feet in a gently sloping downward direction. The presence of this burrow led to the assumption that the wasps had enlarged and modified for their nesting site the upper portion of a tunnel made by some animal.

In order to protect the entrance from precipitation and to observe these insects as long as possible, the entrance was covered at nights and during two light snows with a piece of tenting. On January 1, 1956, no wasps were observed leaving the nest, and it was at that time the nest was uncovered. The temperature though cool was well above freezing. Some wasps were still alive and capable of flight, but had lost the morale for defending the nest. The live catch consisted of three queens, five drones, and fourteen workers. This seemed to be the entire colony except one worker that was seen flying after the nest was removed the following day. A queen flew from the nest and returned. The drones did not fly from the nest, but crawled over the comb near the break in the envelope, frequently touching the comb with their antennae. Two queens were found dead, one rather decomposed. Two dead drones were collected, one with the genitalia extended. After the nest was brought indoors on January 2, five workers emerged from sealed cells, the last on January 11, and two queens emerged, the last on January 14. This colony, so small when the nest was taken, was in early October one in which wasps were entering the nest at the rate of forty-five per minute during mid-afternoons.

On January 22, eight days after the last queen emerged, the combs were separated and observed. The following table gives the circumference of each comb layer, the estimate of the num-

ber of rods that held each layer to the structure above it, the number and kind of cells by count, and the number and caste of unemerged wasps in sealed cells.

Layer from Top	Circumference	Supporting Rods	Queen Cells	Drone-Worker Cells	Unemerged		
					Drones	Workers	Queens
1st	23 in.	76	—	1481	4	—	—
2nd	27 in.	91	—	1837	50	3	—
3rd	26 in.	52	—	1673	85	5	—
4th	28½ in.	66	1267	82	1	2	11
5th	28½ in.	60	1258	—	—	—	11
6th	27 in.	50	1121	—	—	—	2
7th	21 in.	22	796	—	—	—	—
8th	6 in.	1	72	—	—	—	—
Totals		418	4514	5073	140	10	24

The dead drones and workers were in cells that measured about 5.5 cells to the inch, and dead queens were in cells that measured about 4.15 cells to the inch. Reference to the table shows that during the first part of the season until the fourth layer of comb was begun only workers were reared. After the beginning of the fourth layer queen-rearing started, and no doubt about that time some of the cells previously used for workers were used for drones. The ratio of the castes after the nest was brought indoors, including those dead in cells and those that emerged, was 140 drones to 26 queens to 15 workers. Fully one-third of each of the two kinds of cells contained dead larvae on January 22, the date of final examination of the combs. One wonders if the above ratio would have held, in case all of these larvae had developed. Why the number of dead drones so greatly exceeded the number of dead queens is a matter for conjecture.

With such a large number of queen cells the colony apparently had had a great queen-rearing capacity. Yet only about three times were queens seen about the entrance. In December two were seen when the piece of tenting that covered the entrance

was lifted. One was captured and the other entered the nest. On another occasion, as remembered probably in November, one was seen flying from the nest. Though drones were apparently being produced in relatively large numbers in the latter part of the season, only seven were in the nest when it was taken and two of those were dead. What happened to them is a question.

In October the wasps were seen carrying insects into the nest but the kind was not determined. During November, as cold weather came, they began to feed upon dead honeybees around hive entrances thirty to sixty feet from their nest. Once they were seen feeding peaceably alongside bees on bits of honey left on the inside of an extractor tank. For a number of days in late November and early December the wasps made frequent forays into hives past bees on guard at the entrances. Often these marauders came out without pursuers; at other times they were chased out with bees clinging to them. Some of these yellow jackets were observed dead around hive entrances. Occasionally one was seen moving slowly, on the ground near a hive, as if reacting to stings. On November 28, approximately at 3:30 P.M., when the temperature was 33° F., wasps were seen entering a hive. Since bees were in a cluster at that temperature, they could not offer much defense. On the afternoon of November 25 bees were flying to some extent and wasps were entering and leaving a hive frequently. By use of a screen cage twenty-three wasps were caught within forty minutes as they were entering or leaving.

In October, when the nest was first opened, smoke was used to disorganize the colony and by digging to one side of the entrance the paper nest-envelope was partially uncovered. The hole was left open for a week or more. In this interval the wasps piled mud, made by mixing earth with their saliva, up around the nest. When dry this mud had a texture not unlike that of the dome over the entrance, an interlacing of tiny irregularly overlapping ridges of mud splotches. In thus covering the nest the wasps now left a new opening at the bottom

of the original passage and used both the old and the new entrance until the hole was refilled.

The colony withstood some very cold weather although the piece of tenting previously mentioned gave some protection. November 15th was the coldest on record locally for that date as was also the 16th. On the night of the 15th the mercury dropped to − 4°F. and on the morning of the 16th it was − 11°. The highest on the 16th was 31°. The low on the 17th was 5° and the high was 20°. During this period snow blanketed the ground. The nest temperatures because of underground location were probably higher than above ground. Observations by Dr. H. B. Hungerford (1930) and Dr. Reece I. Sailer (1950) indicate that *Vespula arenaria* (F.) is able to modify the temperature of the brood chamber so as to reduce fluctuations as compared to outside changes. Possibly *Vespula pennsylvanica* (Sauss.) has a similar ability.

ACKNOWLEDGMENT

Plate I, accompanying this paper, is reproduced from a photograph by Mr. G. A. Pauli, to whom the author is grateful.

LITERATURE

HUNGERFORD, H. B. 1930. An unusual nest of *Vespula* (*Dolichovespula*) *arenaria* Fabr. (= *V. diabolica* de Saussure) Hym.: Vespidae. Ent. News, 41: 329–330, pl. XXXIV.

SAILER, R. I. 1950. Nest temperature of the common yellow jacket *Vespula arenaria* (F.). Journ. Kan. Ent. Soc., 23: 134–137, figs. 1, 2, and 3.

A New Species in the Genus Evagetes (Hymenoptera: Psammocharidae) with Photomicrographs of the Genitalia and Subgenital Plate

By R. R. Dreisbach, Midland, Michigan

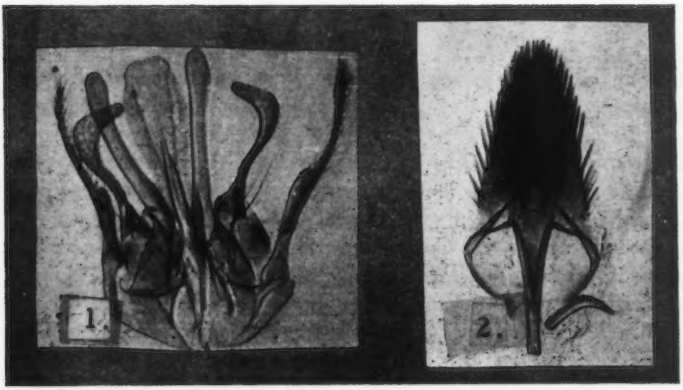
Evagetes asignus n. sp.

Holotype male: Color black, except just a very faint, white line at the upper, posterior orbits; in certain lights the body has a very definite purplish color; a few short, scattered, black hairs on the front, vertex and pronotum, but very few hairs elsewhere; very heavy white, silvery pubescence on the clypeus, face, front, pronotum, sides of the scutellum, dorsal surface of the post-scutellum, on the whole propodeum, and in lesser amount on the ventral parts of the coxa and trochanters; also on the dorsal part of the first tergite and half of the second; the pronotum covered completely with very brilliant, glistening hairs and the hairs on the side of the scutellum and the apex are rather long and not appressed; from the front the head is about as long as wide, clypeus truncate in front, vertex in a slight arch above the eyes with no hump at the ocelli, eyes practically parallel except a small indentation above the middle; from the side the head is very thin, the front very strongly protruding above the eyes, the vertex slightly so, absolutely no posterior orbits, no temples, clypeus flat over its whole length; from the top, the posterior ocelli are on the highest part of the vertex and from the crest this slopes off at an angle giving practically no temples; ratios of first four and last three antennal joints are as: 30:10:15:20:14:14:18; third antennal joint is 1½ as long as second, and ¾ as long as fourth; the interocular distance is 0.62 of the transfacial, and is equal to the vertex width; length of head to width of head is 0.94; interocular at the clypeus is equal to the vertex width; length of clypeus is equal to ⅓ the width of clypeus; posterior edge of pronotum straight across, short, rising in a smooth, even curve; dorsal surface of scutellum U-shaped with very heavy glistening band of hair on sloping sides and on the post-scutellum; very

short longitudinal impression on the dorsal surface of the propodeum which is covered with rather long glistening white hairs which are, however, not appressed; wings cloudy with apex beyond the cells considerably darker; second cubital cell almost rectangular but with the first intercubital bowed at the center, concave on inside of cell; third cubital cell with the sides meeting on the radial vein, or in a few cases not quite meeting, thus triangular; first recurrent vein meets second cubital cell at the apical fourth, the second recurrent meeting the third beyond the center; basal vein slightly basad of the transverse in fore wings and in the rear wings the subdiscoidal and cubital veins are interstitial; in reflected light the first abdominal segment and the basal anterior half of the second one, completely covered with beautiful white glistening hairs; the rest of the abdomen not with the glistening pubescent hairs; legs spined about as in the other species; the ratios of the length of the joints of the posterior legs from the femora on are as 62:61:42:21:16:11:9; subgenital plate rather narrow, triangular without any trace of the basal black teeth which are on genital plate of every other species; normally these teeth are just at the base and about ⅓ of the way in from the sides; rather broad longitudinal ridge in the center of the plate to about the apical fourth; length of thorax and head 3.63 mm., length of abdomen 3.63 mm., length of forewing 5.30 mm., rear wing 4.0 mm., length of genitalia 1.0 mm., width 0.60 mm., length of subgenital plate 0.79 mm., width 0.33 mm.

Holotype male: Kill Devil Hills, NORTH CAROLINA, VIII–3–52, K. V. Krombein (USNM).

Allotype female: Color black with very deep purplish reflections over the whole body except mandibles, and a very short white line on upper posterior orbits, which are reddish; propodeum with a few short hairs; very closely appressed white hairs on the clypeus, face, on the anterior orbits to the antennae, with much more brilliant sericeous hairs on the sides of the scutellum and the dorsal part of the postscutellum; otherwise the body almost completely covered with reddish brown hairs very closely appressed, giving it a purplish, sericeous appear-



1. *Evagetes asignus* n. sp. Genitalia × 60.
2. *Evagetes asignus* n. sp. Subgenital plate × 60.

ance; when seen from the front apex of clypeus is very slightly curved, but practically transverse, vertex at the eyes not higher than the eyes but the ocellar triangle is slightly raised, eyes practically parallel with the exception of a slight indentation above the middle of the head; when seen from the side, the front is slightly raised above the eyes but the vertex is not, clypeus slightly convex, no posterior orbits and no temples; the relative lengths of the first four joints and the last three antennal joints are as 22:9:20:20:16:13:15, thus the third and fourth are of equal length and the second about half as long as the third; the two posterior ocelli are located just exactly their diameter from posterior edge of the vertex where it slopes off to the posterior part of the head; pronotum is slightly concave on the posterior surface with no trace of angulation and a few appressed white hairs at the outer corners of the pronotum and the rest colored with slightly reddish hairs; the raised part of scutellum U-shaped, dorsal part much higher than the sides, the sides are almost vertical, covered with the glistening white hairs as noted before; propodeum slightly slanting on the dorsal surface, but rather perpendicular on the posterior surface with the posterior surface concave and the sides slightly extended

beyond the center parts; the wings very dusky over the whole surface, but much darker beyond the cell, the hind wing almost hyaline on the basal three quarters, third cubital cell is slightly open on the radial vein, second cubital almost rectangular but with the first cubital strongly bowed toward base, therefore concave on inside of cell; basal vein basad of the transverse vein in fore wings; in rear wings the cubitus is slightly basad of the subdiscoidal vein; first tergite slightly concave at the base in front, the abdomen widest about the middle of the second segment; a strong tarsal comb on the fore tarsal joint with 4 spines which are much longer than width of joint, the first one being smaller than the last three, these spines have a slightly reddish tint, especially at tip, the apical spine almost as long as the second tarsal joint; legs well spined similar to the other species of the genus; femora has very short hairs widely scattered; the ratios of the joints of the last leg beginning with the femora are to each other as 57:40:35:35:20:13:16; the interocular distance is 0.74 of the transfacial, and is 0.9 of the vertex width; length of head is 0.9 the width, the distance of the ocelli from the eyes is the same as that between the ocelli; the clypeus is 4 times as wide as long; the longest spur of the posterior tibial joint is ⅝ the metatarsal; length of head and thorax 5.30 mm., length of abdomen 5.30 mm., length of fore wing 8.30 mm., length of rear wing 6.62 mm.

Allotype female: Kill Devil Hills, NORTH CAROLINA, VIII–4–52, Karl V. Krombein (USNM).

There are 105 female and 35 male paratypes from ten states extending from Fla. to Mass. along eastern seaboard to Mich., Kan., Texas and on to Colo.

Paratypes: 6 males, Alachua Co., Fla., IV–7–54, IV–12–52, H. E. Evans and N. Dennis (H.E.E.); 1 female, Alachua Co., Fla., H. V. Weems (H.V.W.); 5 females, Arcadia, DeSoto Co., Fla., IV–2–53, VI–2–53, Evans (H.E.E.); 2 females, Arcadia, Fla., VI–2–53, K. V. Krombein (K.V.K.); 1 female, Olga, Fla., III–30–54, K. V. Krombein (K.V.K.); 2 females, Miami, Fla., III–20–30–53, Krombein (K.V.K.); 1 female, Juniper, Marion Co., Fla., IV–5–53, Evans (H.E.E.); 1 female, Alabama Post, Mobile Co., Ala., IV–2–48, G. D. Valentine

(H.E.E.); 2 males, Kill Devil Hills, N. C., V–30–48, VII–9–50, Krombein (H.E.E.); 7 females, Kill Devil Hills, N. C., V–27–48, VIII–4–52, V–25–48, Krombein (K.V.K.); 73 females, Kill Devil Hills, N. C., VI–23–54, VII–1–54, VII–5–21–50, VI–26–50, VIII–1–4–52, VII–28–52, VI–2–48, IX–16–55, K. V. Krombein (58 K.V.K.) (15 U.S.N.M.); 1 male, Greenville, N. C., VII–6–06 (M.C.Z.); 1 male, Beltsville, Md., VI–17–50, D. R. and S. Shappirio (D.R.S.); 1 male, Cape May Point, N. J., R. G. Schmieder (R.G.S.); 1 male, Browns Mills, N. J., VIII–15–21, F4272 (Am. Mus.); 1 male, Springfield, Mass., Allen (M.C.Z.); 5 males, Kane R., Manhattan, Kan., VI–4–50, VII–16–50, Evans (H.E.E.); 1 male, Reno Co., Kan., VI–18–50, Evans (H.E.E.); 4 males, 6–10 mi. W. Ft. Davis, Tex. on Tex. 166, VII–15–23–48, on *Sphaeralcea augustifolia* (Cave) Evans (H.E.E.); 2 males, 1 female, Conlen, Tex., VIII–7–52, R. R. Dreisbach (R.R.D.); 4 males, 2 females, Lake Co., VII–20–46, Midland Co., VII–13–43, VII–13–37, Arenac Co., VII–26–51, females, Midland, VII–14–37, Benzie Co., VII–28–40, all Mich., Dreisbach (R.R.D.); 1 male, Washtenaw Co., Mich., VII–23–27, N. K. Bigelow (U. of M.); 1 male, Shenandoah, Ia., VIII–16–46, H. B. Green (Ia. State); 1 male, 9 females, Gt. Sand Dunes, Alamosa Co., Colo., VII–20–54, Evans (H.E.E.).

The hairs on the legs of the females do not approach in length or in number those of *E. bradleyi* (Banks). This species is easily distinguished in the male from the other species of the genus by the absence of small teeth near base of subgenital plate, the narrow sickle-shaped volsellae of genitalia, and by the brilliant silvery pubescence as noted in description. The female is distinguished by the very short, sparse hairs on the legs, the lack of temples back of eyes, the short length of third cubital cell on the radius, the deep concavity of first intercubital vein in the first cubital cell, and the fact that the cubital vein in rear wings meets subdiscoidal just apicad of subdiscoidal.

Dr. K. V. Krombein and H. E. Evans have discussed this species in the literature as follows:

KROMBEIN, K. V. Wasmann Jour. Biol. 10: 319, 1953. "*Evagetes,* new species (manuscript of R. R. Dreisbach). Four males (May 24 to June 5), 6 females (May 26 to June 5), 41 females (June 26 to July 22); predominantly in woods, but occasionally on barrens; 2 females on foliage of *Q. mari-*

landica. This may be *E. brevicornis* (Cresson), but that cannot be determined until it is possible to dissect the genitalia of the type specimen, a male."

KROMBEIN, K. V. Proc. Ent. Soc. Wash. 55: 130, 1953. "*Evagetes,* n. sp. (MS. of R. R. Dreisbach). 29 females, 3 males, July 28–August 4; the majority on barrens; 6 females, 1 male on *Q. virginiana;* most specimens worn."

KROMBEIN, K. V., and EVANS, H. E. Proc. Ent. Soc. Wash. 56: 230, 1954. "*Evagetes,* n. sp. (Dreisbach MS.). Miami (2 females), Arcadia (6 females), Juniper Springs (1 female); mostly on sand flats."

KROMBEIN, K. V., and EVANS, H. E. Proc. Ent. Soc. Wash. 57: In Press, 1955. "*Evagetes,* n. sp. (Dreisbach MS.). Marco (2 males), Olga (6 females, 9 males), Ft. Pierce (2 females, 1 male)." These were all taken on sand covered with sparse vegetation.

Phlegethontius caribbeus Cary. Discovery of a Second Specimen (Lepidoptera: Sphingidae)

In October 1952, in Vol. lxiii, No. 8, of the ENTOMOLOGICAL NEWS I described a new species of Sphingid, caught by me in Haiti in March 1952, naming it *Phlegethontius caribbeus.* This was a female caught at Petionville, a town 1,600 feet high, very near to Port au Prince. This specimen, the type, is in the Type Series at the Academy of Natural Sciences in Philadelphia. A young Yale Senior named John G. Coutsis was collecting Lepidoptera for Yale in May, 1954, and found this second specimen, a male, at lights in the country halfway between Port au Prince and Petionville, but also in high hill country. The male is somewhat smaller than the female, but is a perfect, unrubbed specimen. Inasmuch as it is risky to describe a new species from one insect only, it is well to record the second of this species, in very much the same locality.

MARGARET M. CARY

A New Tersilochine Parasite of the Rose Curculio (Hymenoptera: Ichneumonidae)

By Luella M. Walkley, Entomology Research Branch, Agricultural Research Service, United States Department of Agriculture

Some time ago Dr. W. V. Balduf sent for identification a number of specimens of a parasite he had reared from the rose curculio, *Rhynchites bicolor* (F.). He is preparing for publication a paper on the "Rose Hip Community," including in it the biology of the rose curculio and its parasites. The parasite received from him represents a genus and species of Tersilochini new to the described Nearctic fauna.

This new species fits the description given by Foerster, 1868 (Verh. naturh. Ver. preuss. Rheinlande u. Westphalens 25: 148) for *Temelucha,* a genus described without included species. Unfortunately the first species included in *Temelucha,* and thus its genotype,[1] was *Temelucha philippinensis* Ashmead, 1904 (Jour. N. Y. Ent. Soc. 12: 18),[2] a cremastine actually belonging in the genus *Cremastus* Gravenhorst. H. L. Viereck's 1914 designation (U. S. Nat. Mus. Bul. 83: 144) of *Temelucha plutellae* Ashmead, 1904 (Canad. Ent. 36: 101),[3] the second included species, as genotype of *Temelucha,* is invalid. Szepligeti was the first European author to include tersilochine species in the Foerster genus without question (1905, Ann. Mus. Nat. Hung. 3: 531–532). Most of the later European authors have treated *Temelucha* as a tersilochine genus but since *Temelucha* is a synonym of *Cremastus* Gravenhorst, a new genus is needed for species fitting the characterization given by Foerster.

A revision of the tribe Tersilochini based on a study of the type specimens of the genotype is needed before many of our Nearctic species, described and undescribed, can be correctly placed or genera adequately defined. For this reason the following new genus is described only in comparison with other tersilochine genera whereas the species description is complete.

[1] Zool. Nomencl. Bul., vol. 4, 1950, pp. 160, 346.
[2] Received at Smithsonian Institution March 28, 1904.
[3] Mailed April 6, 1904.

LUCHATEMA, new genus

Genotype: *Luchatema baldufi,* new species.

The upcurved ovipositor, the polished abdomen, the thickening of the basal vein of the forewing where it joins the stigma, the right angle formed by the two abscissae of the radius, and the broad clypeus with an apical fringe of hairs are all characters which place this genus in the Tersilochini.

Luchatema may be separated from *Barycnemis* Foerster, *Leptopygus* Foerster, and *Cratophion* Thomson by the shape of the thorax, which is almost as high as long in both sexes (ratio of approximately 7:8) whereas in the other genera mentioned the thorax is almost twice as long as high in the females and at least one and a half times as long as high in the males. The basal area of the propodeum is approximately only one-sixth as long as the petiolar area. In these respects *Luchatema* resembles *Tersilochus* Holmgren, *Heterocola* Foerster, *Allophrys* Foerster, *Aneuclis* Foerster, *Isurgus* Foerster, and *Ischnobatis* Foerster (as represented in the U. S. N. M. Collection). The median basal carina of the propodeum and the position of the propodeal spiracle (distant by at least its diameter from the pleural carina) separate this new genus from *Tersilochus;* from *Aneuclis* it can be distinguished by the longer ovipositor which is at least as long as the whole body; from *Isurgus* and *Allophrys* by the longer antennae (28–33 segmented); from *Heterocola* by the shorter palpi (in *Heterocola* the palpi are fully as long as head is high), and by the postfurcal second recurrent (in *Heterocola proboscidalis* (Thoms.), genotype of *Heterocola,* the second recurrent is antifurcal); and finally from *Ischnobatis* by the more or less rugulose propodeum.

Luchatema baldufi, new species

Holotype ♀: Length of body 7 mm., ovipositor 7 mm., antenna 3.4 mm., forewing 5 mm. Black except clypeus, mandibles, palpi, legs, abdomen, and ovipositor which are reddish brown with the antennae, legs, mandibles, clypeus, and mouth parts more testaceous. The holotype and several other specimens have a reddish tinge on the propodeum and mesopleura.

Head transverse, broader than long and broader than thorax;

eyes slightly convergent, temples full, nearly as long as eyes; ocelli small, the two lateral ocelli closer to each other than to compound eyes; clypeus more than twice as broad as long, the apical margin rounded but with the middle third somewhat truncate; malar space nearly as long as basal width of mandible; palpi very slender, maxillary palpi 4-segmented, labial palpi 3-segmented; tongue as long as labial palpi; upper tooth of mandible longer than lower tooth; antennae 29-segmented; antennal crypts separated by about 2½ times their diameter, but distant from eyes by slightly less than their diameter; face rather closely though finely punctate; clypeus very sparsely punctate with fringe of hairs on median apical third.

Thorax at least seven-eighths as high as long, polished, pubescent, and finely but densely punctate; notaulices faintly impressed only anteriorly and bordered on the upper side by a very irregular carina. Scutellum with sides carinate only on basal half or less, scutellar fovea crossed by seven short carinae (in the paratype series these vary in number from 5 to 8); mesopleural fovea and mesopleural suture also crossed by similar carinae; propodeum rugose and rugosely punctate, with a short median basal carina meeting the one transverse carina where the propodeum becomes abruptly declivus, the petiolar area divided into three distinct areas by two longitudinal carinae, a small round, propodeal spiracle at the end of a short carina (at least as long as the diameter of the spiracle) extending from near the anterior end or base of the lateral carina; wing venation characteristic for the tribe, the veins reddish brown and the stigma darker except for small anterior and posterior portions yellowish, tegulae testaceous; so-called second trochanter of legs not distinct; hind basitarsus nearly as long as remaining segments combined, tibial spurs short and subequal; abdomen polished lacking pubescence, with long slender petiole about two-thirds length of thorax, elongate gastrocoeli of second segment nearly as long as half the width of base of segment, epipleura of abdominal tergites not separated by a fold or carina; ovipositor about as long as body, slender, up-curved, with apical notch shallow; sheaths blackish with reddish tinge, slender, sparsely hairy and ridged.

Allotype male: Length 7 mm., antennae 31-segmented. Except for usual sex differences similar to female.

Additional material, which includes 66 ♂♂ and 92 ♀♀, shows the body length to vary from 4.2 to 7 mm. in the ♂♂ and from about 4.3 to 7 mm. in the ♀♀. The number of antennal segments varies from 28 to 33 in the ♂♂, and from 28 to 31 in the ♀♀. Variation also occurs in both sexes in length of median basal vein and in rugosity of sculpture of propodeum; in the distance of the propodeal spiracle from the pleural carina; and in the elevation of the propodeal carinae; in the extent of black on the petiole and blackness of thorax (some specimens have a reddish tinge while others are jet black, the latter with the browns also darker).

Holotype ♀, *allotype* ♂, and 134 *paratypes* (54 ♂♂, 80 ♀♀) are in the U. S. National Museum Collection under Type No. 62981. Twenty-four paratypes (12 ♂♂, 12 ♀♀) were sent to Dr. Balduf. Several specimens with head or abdomen missing are not included in the type series.

Type locality: Chetek, WISCONSIN. Paratypes came also from the following localities: Black River Falls, Solon Springs, and Endeavor, all in Wisconsin; Ely, Minnesota; Saskatoon, Saskachewan; and Urbana, Illinois. In the U. S. National Museum Collection are 25 specimens from Massachusetts, New York, Iowa, South Dakota, and Wyoming which I believe are this species.

Host: *Rhynchites bicolor* (F.), the rose curculio. Reared by Dr. Balduf.

Three specimens from Virginia with no definite median, basal longitudinal carina on the propodeum belong either in the genus *Luchatema* or *Tersilochus*. The elongate gastrocoeli make me believe the species they represent is not *Tersilochus* but until I can see the genotype, *Tersilochus iocator* (Grav.), I cannot be certain of the characters that identify the genus. Finally a single specimen, from Pringle, South Dakota, with a definite median longitudinal carina on propodeum may possibly belong in the new genus, but, because of the shorter gastrocoeli and ovipositor, placement must await a revision of the tribe.

Three New Nicaraguan Diplopods

By Ralph V. Chamberlin

Among myriopods collected in 1955 by Borys Malkin, in connection with ethnozoological studies among Indians of Mexico and Central America, were representatives of three new species described herewith.

Rhinocricus malkini n. sp.

Metazonites above reddish chestnut in bands that narrow down the sides; the prozonites where exposed on sides and below of a brownish color. Legs pale brown.

Antennae very crassate, with the sixth article broader than the fifth; sensory cones very numerous. Clypeal foveolae 2–2. Surface of head smooth and shining. The median longitudinal sulcus fine, interrupted near middle of length as usual. Eyes widely separated; composed of about 32 ocelli arranged in six transverse series.

Segmental sulcus fine, touching, or nearly touching, the pore opposite which it is angled, obscure or absent in middle of dorsum. Prozonites and metazonites longitudinally striate only beneath, the surface otherwise smooth and shining. Scobina small and widely separated much as in *R. nicaraguanus,* present for a considerable distance beyond middle of body; fovea elliptical; striate area narrowing to an angle caudad.

Anal tergite rounded behind; smooth excepting a cross stria or furrow near middle of length; much surpassed by the valves, which are smooth, compressed and protruding along medial border.

Gonopods of the male as shown in figs. 1 and 2.

Number of segments 42.

Width, 10 mm.

Locality.—Nicaragua: Musawas, Waspuc River. Male *holotype* taken by B. Malkin, Sept. 17–30, 1955.

Close to *R. nicaraguanus* in structure of scobina and antennae, but with the anal scale triangular instead of trapeziform. The reddish chestnut annuli of the metazonites are broader, embracing the segmental sulcus instead of lying behind it.

Aceratophallus sumucus n. sp.

Tergites orange, the middorsal area of a darker, more brownish shade than the keels. Legs yellow and the antennae yellow of darker shade.

Collum with anterior and lateral margins together forming an evenly convex curve ending on each side at the caudal angle which is acute; caudal margin widely incurved at middle and again incurved or indented more lightly toward the angle on each side.

Tergites with keels moderately elevated; lateral margin of keel smooth; anterior margin convex and corner well rounded; caudal corners angular, the angle more strongly produced and acute in proceeding caudad; caudal margin concave mesad of the process and convex toward mesal end; lateral border thickened, more strongly so about pore, the latter directed dorsad. Surface of tergites smooth and shining.

Gonopods of the male in general structure nearest to those of *A. lamellifer* Brol. but having the distal lobe of the telepodite more prolonged and acuminate, much exceeding the solenomerite in length rather than being about equal to it as in *lamellifer*. See further Fig. 3.

Width, 6.2 mm.; length, about 40 mm.

Locality.—NICARAGUA: Musawas, Waspuc River. The *holotype* is a male taken Sept. 17–30, 1955.

The species is substantially larger than *A. lamellifer* Brol.

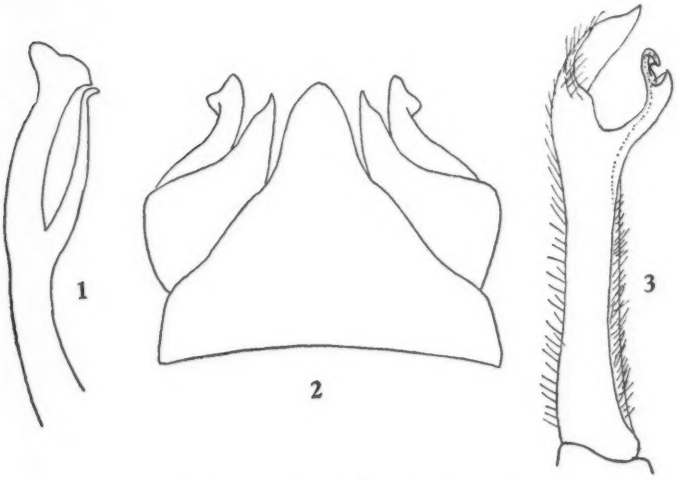
Platydesmus nicaraguse n. sp.

Dorsum uniform brown, without markings except a median longitudinal light line. Legs yellow. Head brown above, yellow below. The rounded lateral ocelliform prominences without pigment.

Collum nearly completely covering the head from above; anterior margin acutely incised at middle, convex each side between the forwardly directed keels the outer margin of each of which parallels the longitudinal axis of the body.

The two rows of tubercles on the ordinary tergites composed of 10–12 well defined tubercles laterad of which the tubercles are reduced and merge in a field of granules over the keels.

Last tergite surpassed by the keels of the preceding segment, ending caudally in a laminate process which bears on its caudal margin a transverse series of four teeth; a larger tooth each



Rhinocricus malkini n. sp. Fig. 1. Posterior gonopod. 2. Anterior gonopod. *Acerotophallus sumucus* n. sp. 3. Gonopod.

side of base of the process much as in *P. perpictus* but the caudal lamina narrower at base than in that species.

Length, 24 mm.; width, 7 mm.

Locality.—NICARAGUA: Musawas, Waspuc River. Many specimens taken Sept. 17–30, 1955.

Most readily separated from other known species from the Central American area by the characteristic form of the collum.

The New Haven Entomological Society

The New Haven Entomological Society is too young to have acquired tradition, but it is active and vigorous. Sparked by an organizing committee composed of C. L. Remington, P. B. Dowden, and R. L. Beard, the first meeting was held October 18, 1949, with 31 charter members.

Membership in the Society is more cosmopolitan than the name might suggest. New Haven is not a large city, but three institutions employ entomologists, who make up a fair share of the membership. These are The Connecticut Agricultural Experiment Station, the Forest Insect Laboratory of the Northeastern Forest Experiment Station, and Yale University. In addition, a number of active and loyal participants are outside the immediate New Haven area. These include teaching and student entomologists from the University of Connecticut at Storrs and the New Britain State Teachers College, professional entomologists from several industrial laboratories, and a number of amateur insect collectors.

Evening meetings are held once a month, on the third Friday, from October through May. One meeting a year is held at the University of Connecticut, and one is held at the Forest Insect Laboratory. The other meetings are held at either the Connecticut Station or at Yale University, whichever seems most appropriate for any given meeting. Usually a formal paper or lecture is given. This is followed by an informal discussion period when members exhibit interesting specimens, discuss recent entomological literature, meetings, etc. Light refreshments are served. For the last three years the members have prepared and served a regular dinner at their annual meeting in April, at which time a semi-popular lecture is given and members' wives (or husbands) and other guests are encouraged to attend. The success of these meetings indicates the probability of their becoming an annual event. The May meeting is strictly informal. Most of those present usually participate by telling about some interesting entomological observation. The regular programs have been quite varied. Some excellent papers have been presented by members and a number of outstanding

entomologists have been guest speakers. A rough breakdown into subject matter indicates that approximately the same number of papers have been given on insect taxonomy, physiology, biology, ecology, economic entomology and miscellaneous subjects. There are now 57 members representing 8 institutions. Attendance at meetings has steadily increased with the last year's average being 36. Annual dues are only $1.00. Visitors are most welcome.

The present officers are J. Peter Johnson, President; Norman Davis, Vice-president; Franklin B. Lewis, Secretary; and S. F. Potts, Treasurer.

J. PETER JOHNSON

Entomological Departments

Believing such material to be of interest to its readers, ENTOMOLOGICAL NEWS herewith solicits articles similar to the one here presented and giving information on the organization and activities of entomologists in colleges, universities, museums, and in government and other groups.

Entomology in the Connecticut Agricultural Experiment Station

The CONNECTICUT AGRICULTURAL EXPERIMENT STATION was established by the Connecticut Legislature in 1875 as an independent state research institute for agriculture. Entomology received some attention early in its history, but was a minor field of research before the appointment of W. E. BRITTON as horticulturist. Dr. Britton's interest in insects and the arrival of San Jose scale in the State resulted in the establishment of a DEPARTMENT OF ENTOMOLOGY in 1901. This department was given the responsibility for regulatory work, research and extension. The establishment of the Federal Extension Service eventually removed the necessity for extension.

In the early years of the Department, the principal work was regulatory, but there were many studies of life history and distribution of economic pests. A collection of Connecticut insects was started, and taxonomic studies encouraged. A check list of

the insects of the State was issued, and monographs on the Orthoptera, Odonata, Hemiptera and Hymenoptera published as bulletins of the State Geological and Natural History Survey. Publication of the Diptera of Connecticut is still in progress.

Research on a large scale was started in 1919 by the appointment of PHILIP GARMAN. Dr. Garman worked on the Odonata and has devoted much time to the taxonomy of mites. His experimental work on biological control has been outstanding, and he is a leading authority on control of fruit insects.

The staff was enlarged during the period 1920–1930. In 1940, the character of the research of the department was altered under the leadership of Dr. ROGER B. FRIEND. He added staff members for fundamental investigations, particularly in physiology and ecology. The economic workers were encouraged to devote part of their efforts to investigations of a lasting character.

The present organization is as follows:

Regulatory and Service

W. T. BRIGHAM, B.S., Deputy State Entomologist, in charge of nursery and apiary inspection.

O. B. COOKE, Deputy in charge of Gypsy Moth Control, also supervising blister rust control and inspection for aircraft application of insecticides. His office has 16 field men.

J. P. JOHNSON, B.S., in charge of identification and service.

B. W. MCFARLAND, photographer.

Research

PHILIP GARMAN, Ph.D., mite taxonomy and biology and control of fruit pests.

ROGER B. FRIEND, Ph.D., forest entomology.

RAIMON L. BEARD, Ph.D., insect physiology, toxicology.

JOHN C. SCHREAD, M.S., biology and control of pests of ornamental plants.

JAMES B. KRING, Ph.D., ecology of wireworms and aphids, control of pests of tobacco and potatoes.

RICHARD QUINTON, Ph.D., biology and control of pests of forage and vegetable crops.
ROBERT C. WALLIS, Sc.D., ecology, medical entomology.
CALVIN A. LANG, Sc.D., biochemical phases of physiology.
DOUGLAS O. WATERHOUSE, Sc.D. (Asst. Chief, Division of Entomology, C.S.I.R.O., Australia). Visiting scientist, insect physiology.
NEELY TURNER, M.A., Chief entomologist, insecticide toxicology.

Four full-time laboratory technicians.
Three summer technicians.
Two secretaries.

The entire staff is on a full-time basis, and there is no teaching. Much of the fundamental work makes use of insects of economic importance. The individual researchers are responsible for the planning and execution of their work; however, consultation with other workers handling similar problems has proved to be very fruitful.

The physical facilities include some ten office rooms, six modern laboratories built since 1947, six air-conditioned rooms for a temperature range of 32° F. to 80° F., a battery of incubators for more accurate temperatures, and a large greenhouse. The collection of Connecticut insects is reasonably complete, and is being transferred to Cornell-type drawers. The library is adequate, and includes full sets of most American entomological journals. Informal cooperation with Osborn Zoological Laboratory of Yale University on journal subscriptions makes available an unusually large collection. Additional office and laboratory space will be available in about two years when a new station research laboratory building, now in the final planning stages, will be completed.

Facilities for field experiments are available at the Mount Carmel Farm, about six miles north of the Station, and at the Windsor Tobacco Laboratory in the Connecticut River Valley. —NEELY TURNER.

Notes and News in Entomology

Under this heading we present, from time to time, notes, news, and comments. Contributions from readers are earnestly solicited and will be acknowledged when used.

Professor Needham Celebrates 88th Birthday. Professor JAMES G. NEEDHAM, Professor Emeritus of Entomology at Cornell University, passed his 88th birthday on March 18th. Probably the most widely known and loved of American entomologists, his interests as shown by his publications have ranged over a very wide field, from highly specialized taxonomic papers to broad fundamental work on insect wing genealogy, and to text-books for the use of students. His main interest has been the aquatic insects, their classification and their ecology. Of the 25 books he has written some are text-books—on insects, on general biology, and on fresh-water biology—some are of a general nature (Natural History of the Farm, The Animal World, About Ourselves); then there are the monographs (usually in collaboration with other specialists) on the aquatic insects of New York, on may-flies, on stone-flies, on leaf-miners, and on dragonflies, and finally there is a volume of verse, "Ontario and other verses." His most recent work (with M. J. Westfall, Jr.) is "A manual of dragonflies of North America." This fine volume of 615 pages was reviewed in ENTOMOLOGICAL NEWS for April, 1955.

The many friends who knew of Professor Needham's recent illness will be happy to learn that, beginning February, he has improved so greatly that he has returned to serious work on his proposed text-book on "Animal Ecology."—R. G. S.

Report on Biting Flies from Panama. In the Annual Report of the Gorgas Memorial Laboratory for 1955, Dr. GRAHAM B. FAIRCHILD states that the work on *Phlebotomus* has continued through the year, and over 10,000 new specimens have been processed and identified. Compared with the 16 species reported from Panama for 1948, a total of 39 has now been described. There still remain about 20 species from Panama and an equal number from other parts of Central America which remain to be described.

Work was completed on a study of the general classification

of *Phlebotomus* and their relationships with other Psychodidae. The *Phlebotomus* of the world are divided into 5 subgenera, 3 of which occur in the Western Hemisphere. The subgenera are in turn divided into groups and series, the New World species comprising 11 groups and 15 series.

A considerable collection of *Phlebotomus* was received for identification from the Trinidad Regional Virus Laboratory through T. H. G. AITKEN. This included 6 species, 4 of them previously unrecorded from Trinidad, but all known from the South American mainland.

The work on Tabanidae, resulting from Dr. Fairchild's trip to European museums in 1953, was finally completed and submitted for publication. Study of the type specimens of nearly 400 species has shown the necessity of changing the names or taxonomic positions of about 70 species of Neotropical horseflies. Based partly on this study, a contemplated series of revisional papers on Neotropical Tabanidae in collaboration with Dr. C. B. PHILIP of the Rocky Mountain Laboratory of the National Institutes of Health was initiated, the first paper, on the genus *Chlorotabanus,* being completed. In addition, a number of collections of Tabanidae from Zenezuela, Brazil, Peru, and Trinidad were received from various agencies and individuals for determination.

The Gorgas Laboratory has been active since 1929 and at present has a staff of six scientific workers under Dr. CARL M. JOHNSON, Director. In addition to Dr. Fairchild there are two other medical entomologists, Dr. MARSHALL HERTIG, who was absent over two years directing the work on the hemorrhagic fever in Korea, and Mr. PEDRO GALINDO.—R. G. S.

Reviews

DIE WANDERAMEISEN DER NEOTROPISCHEN REGION, by Thomas Borgmeier, O. F. M. Studia Entomologica, Nr. 3. (Editora Vozes Limitada, Caixa Postal 23, Petrópolis, Rio de Janeiro, Brazil.) 717 pp., 87 pl., paper. 1955. Price, $15, U. S.

This is the masterwork of a distinguished entomologist. It deals with the New World army ants, around which his interests have centered for half his lifetime, and, accordingly, it

amounts to an encyclopedia of these insects. It completes and summarizes his revision of the New World dorylines up to the present with exemplary thoroughness and clarity, yet without excessive detail. The keys work, at least as far as I have tried them; a workable key is still unusual enough among publications on ants to attract special attention, but it is also the reflection of a sound and natural system. The arrangement of the material in the text is orderly and sensible, and the figures are both very abundant and fully relevant.

The long essay near the front of the book entitled *"Grundfragen der Systematik"* favors separation of taxonomic from evolutionary studies, and generally deprecates the neodarwinian approach and "the new systematics." After this introduction, however, we enter with the author the sound and orderly world of the new army ant system, of which Father Borgmeier has so largely been the architect. Here the intellectual *"Grundfragen"* are usually hard to follow among the fascinating realities of structure, distribution and affinity so clearly revealed among the New World Dorylinae. The author has completed his job not only with rare precision and thoroughness, but also with the advantage of a well-developed "taxonomic instinct." The resulting treatment, with few exceptions, would satisfy most neodarwinists, and its general tone reveals that Father Borgmeier is perhaps more strongly influenced by neodarwinian views and practices than his introductory remarks would seem to allow.

The systematics of army ants is peculiar in that one set of species was early based on the males and another on the worker caste; in only a fraction of the cases have the male-worker associations been confirmed. This means that a large proportion—perhaps one-third—of the 140 species names recognized by Borgmeier in this classification will fall as synonyms when all associations are finally made. This circumstance seems unavoidable in a group where either sex is commonly found separately by the usual collecting methods, but in which the association can be made only when whole colonies are taken at restricted seasons. Borgmeier has dealt with the two castes separately in large part, but always with an eye to confirmed and probable associations between them.

In the course of preparation of the work, nearly all relevant type material was examined, and the complete synonymy attests the author's sure handling of the excess nomenclature. Some 60 names fall into the synonymy in this work and in the *"Vorarbeiten"* by the same author, brought out in 1953. Many others are treated as subspecies, usually equivalent to the geographical races of current practice. The treatment of each species is accompanied by special notes, where there is anything to be said, with the headings, *"Diskussion," "Synonymie," "Biologie"* and even—luxury of luxuries—*"Originalbeschreibungen."* The characterizations make extensive use of quantitative data, and are for the most part quite definite about points of specific differentiation. Descriptions and keys extend to all known castes of each species. Notes are given on inquilines and parasites of each species for which they have been studied.

The text and captions are remarkably free of typographical errors, at least to the extent that my reading has reached, and the German sentences are mostly short and clear. I think that most Latin American and North American users of the book will have little difficulty in reading it.

It appears that ant systematics is entering a period of intensive revision and consolidation marked by the appearance of exhaustive works of the "reference monograph" type. Father Borgmeier's book is an outstanding example of this kind of work, for long so rarely produced by ant specialists. In view of the great interest these army ants have for biologist and layman alike, it is indeed gratifying to have at hand for the first time such a complete yet compact summary of their classification and biology.

This book, along with the well-known detailed biological studies by T. C. Schneirla and his colleagues, brings our knowledge of neotropical army ants up to a position at least even with that for most of the familiar northern ant groups. It will be indispensable, not only to myrmecologists, but also the students of the varied and remarkable insects that live with army ants, and to students of insects and evolution everywhere.—W. L. Brown, Jr., Museum of Comparative Zoology, Cambridge 38, Mass.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Conopidae of the World wanted. Will pay 10¢ to $1.00 for pinned and labelled specimens. S. Camras, 4407 N. Milwaukee Ave., Chicago 30, Illinois.

Anisoptera—Nearctic sp. wanted for exchange, espec. Ophiog., Arigom., Aeschna, Neurocor., Somatoc., Cordulia, Dorocor., Leucor. R. D. Cuyler, Dept. of Entomology, N. C. State College, Raleign, N. C.

Bembicini and Stizini (Hym., Sphec.) of New World wanted for revis. study. Will return upon request or at end of project. James E. Gillaspy, Dept. of Zoology, Univ. Texas, Austin 12, Texas.

Agapema galbina. Will exchange cocoons of this moth for nature books. E. Frizzell, Route 4, Box 96, San Benito, Texas.

Wanted—Data on exact location of colonies of *Epibembex* (olim *Bembix*) (Hymenoptera), any species, any part of country, for biological studies. Howard E. Evans, Dept. Entomology, Cornell Univ., Ithaca, N. Y.

Fanniinae wanted on loan (nearctic and holarctic), and information on collections. James G. Chillcott, Dept. Entom., Univ. of Kansas, Lawrence, Kan. (Loans may be charged to Dr. C. D. Michener.)

Tenebrionidae of the World wanted, in exchange for insects of Argentina and neighboring countries. Horacio J. Molinari, Av. Lib. Gral. San Martin 55, Acassuso (Buenos Aires), Rep. Argentina.

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